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DINOSAUR TRACKS IN HAMILTON COUNTY, TEXAS

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Attention has been called by E. W. Shuler to the occurrence of dinosaur tracks in the Glen Rose limestone of Lower Cretaceous age, near the town of Glen Rose, Somervell County, Texas.¹ Another interesting occurrence of similar tracks has recently come to light in the extreme southern portion of Hamilton County, Texas, about sixty miles south-southwest of the first-mentioned locality (Fig. 1).

The tracks in Hamilton County are also in limestone belonging to the Glen Rose formation. They are exposed in the bed of Cottonwood Creek (Fig. 2), a small headward tributary of Lampasas River, and are confined to a single stratum of rather soft, compact, yellowish limestone about a foot thick, which for a distance of probably 800 feet makes the bed of the creek. In the Glen Rose locality the tracks were evidently made by one individual moving continuously in the same direction; but in Hamilton County they were made by a number of individuals, and the tracks point in every direction of the compass, this spot seemingly having been a favorite haunt of dinosaurs of every size and presumably, also, of every age.

The examination upon which these notes are based was made hurriedly and without adequate means properly to clear the creek bed of the accumulated débris. Normally this portion of the bed of Cottonwood Creek is covered with several feet of water, but the unusually dry summer season of the past year offered a favorable opportunity to examine the footprints, since the creek was free from running water; but it developed that cattle which frequent the water holes along the creek had worked down shale and gravel from the banks in such quantities that almost the entire surface

¹ *Amer. Jour. Sci.*, Vol. XLIV (October, 1917), pp. 294-98.

of the rock was covered with mud or sun-baked soil to a depth varying from several inches to as many feet. It was therefore impossible to clean off the rock over more than limited areas in the short time available.

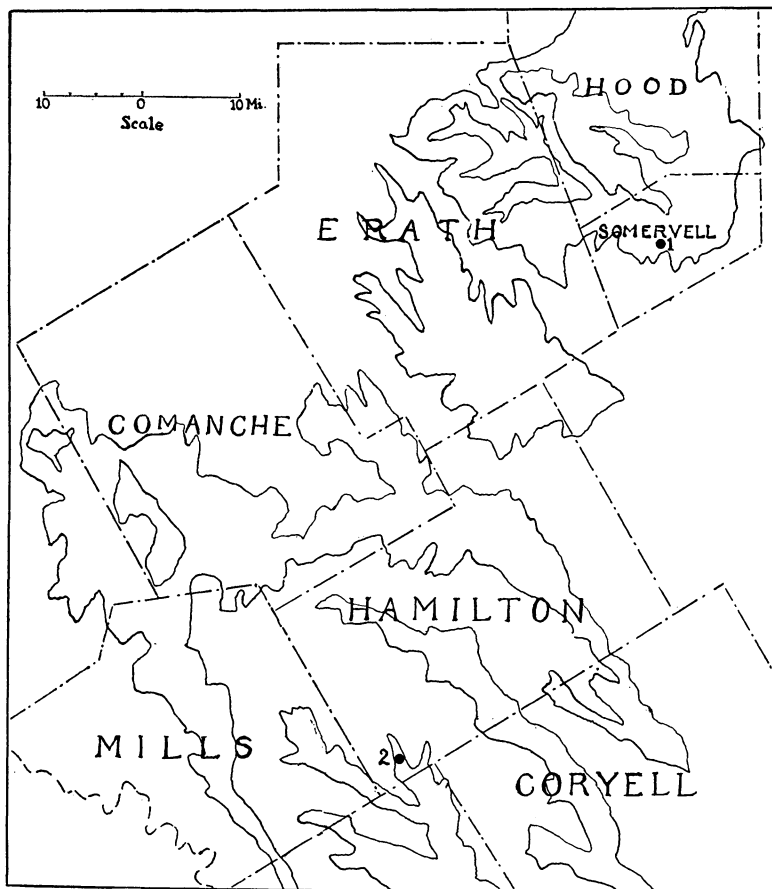


FIG. 1.—Sketch map of a portion of Central Texas showing outcrop of Glen Rose Formation. (After R. T. Hill.) 1, location of Glen Rose tracks. 2, location of Hamilton County tracks.

A spot was selected at random, and the soil was removed from a space about four feet square. Three well-defined tracks were exposed within this space, and four others were less clearly recognizable (Fig. 3). At six other spots the soil and gravel were removed

from patches two to four feet square, and in each instance one or more tracks were found. Some of the tracks were shallow, due to the abrasion of gravel swept over the bed rock by the swift water of freshets, and others were rendered indistinct by superimposed tracks. The creek bed, which is floored with the stratum carrying the tracks, varies in width from four to twelve feet for a distance



FIG. 2.—Cottonwood Creek along bed of which dinosaur tracks are found. (Photo by C. B. James.)

of about 800 feet. On the basis of the writer's observations, he is convinced that the estimate made by residents of the neighborhood, placing the number of tracks at considerably over a hundred, is not likely to be extravagant. This number could quite likely be considerably increased by clearing away the slumped material along the foot of the caving banks. Reliable parties who have seen the locality when the whole expanse of rock in the creek had been swept clear of its covering state that it exhibits a maze of tracks

for fully two-thirds of the foregoing distance. Near the lower or southern end of the rock exposure, where erosion has cut through the level-lying stratum bearing the tracks, a marginal expanse of the limestone on either side of the channel shows that the tracks are infrequent or entirely absent, but northward they are known to be present until the rock disappears under the stream bed.

The footprints examined varied in length from eight to twenty inches. A plaster cast made by Mr. C. B. James, of Hamilton,

shows the dimensions indicated in Figure 5. This particular track was covered with deep mud at the time of the writer's visit, but enough mud and water was baled out to determine that it was only one of three large tracks within a space of scarcely more than a square yard.

Near the southern end of the locality, where the tracks are infrequent, a single, large, well-formed track three or four inches deep and about fifteen inches long was found. Judging the probable direction of movement from the orientation of the track,

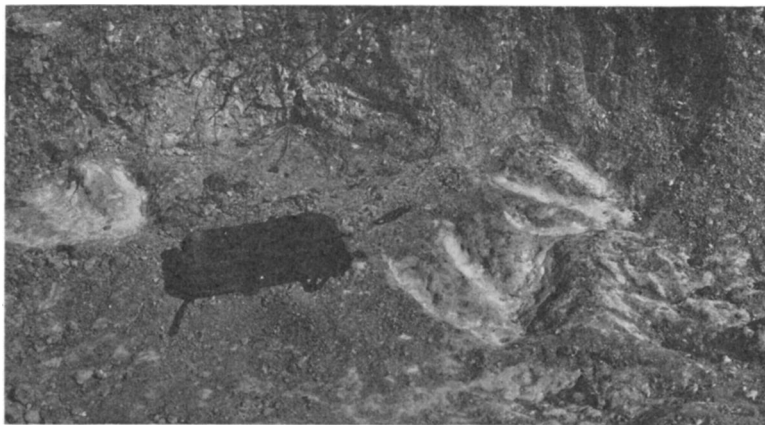


FIG. 3.—Dinosaur tracks in the bed of Cottonwood Creek, Hamilton County, Texas. (The tracks were lightly dusted with white powder to secure definition in the photograph.)

it appeared that other tracks of the same individual should be present on the uncovered rock. Two saucer-shaped depressions were located in the direction of motion, at intervals of about four feet, which were apparently vestiges of footprints, though quite indistinct. The stride of the animal seems therefore to have been about the same as that measured by Shuler at Glen Rose, and the size of the tracks in the two localities corresponds quite closely. This was the only instance in which the stride of a given individual could be measured, though undoubtedly other instances could be found if the rock were adequately cleared of débris.

A correlation of the geologic horizons at which the tracks are found in Somervell and Hamilton counties would be particularly

interesting, but at this time such a correlation cannot be made with any degree of accuracy. Shuler placed the Glen Rose tracks in the middle third of the Glen Rose formation which at that locality has an approximate total thickness of 315 feet.¹ In Hamilton County the interstream divides are capped with basal Edwards limestone containing an abundance of chert. The dinosaur tracks are about 200 feet below the lowest chert bed. Immediately beneath the Edwards limestone are the soft, chalky beds of the



FIG. 4.—Dinosaur track of which dimensions are shown in Figure 5. (Track dusted with white powder.) (Photo by C. B. James.)

Walnut formation, eroded to form a wide, shallow valley, and in the midst of this valley Cottonwood Creek has cut down slightly into the Glen Rose beds. The upper limit of the Glen Rose could not readily be determined in the immediate locality, owing to poor outcrops, but it is tentatively placed about fifty feet above the horizon of the tracks. This tentative correlation is not of much assistance, however, as the total thickness of the Glen Rose is nowhere exposed nearby, and there are no reliable data upon which to postulate thickness in this vicinity. The Glen Rose formation

¹ R. T. Hill, *Twenty-first Annual Report U.S. Geol. Surv.*, Part VII, p. 153.

is probably thicker here than in Somervell County, and northward it thins out and almost completely disappears northwest of Fort Worth, where the Paluxy and Trinity sands, ordinarily separated by the Glen Rose, merge into one thick formation known as Antlers sand.

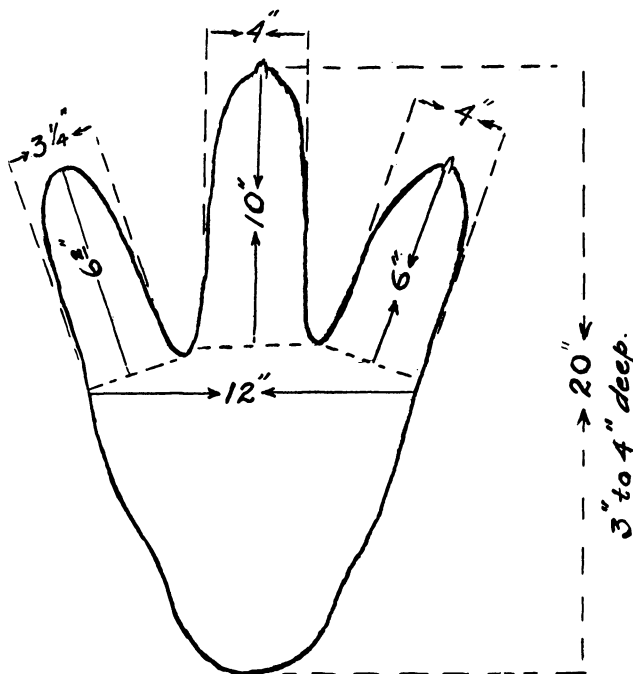


FIG. 5.—Diagram showing dimensions of track in Figure 4

It is interesting to note that R. T. Hill in 1886 found dinosaur bones in the upper strata of the Basement sands of the Lower Cretaceous near Lambert, Parker County,¹ and that he assigned the name "Dinosaur sands" to this horizon.² It is reasonably certain that the beds in which the bones were found are approximately the equivalent of those in which the tracks occur in Somervell and Hamilton counties.

The writer expresses no opinion as to whether the tracks in the two localities were made by dinosaurs of the same species. The

¹ *Twenty-first Ann. Rept. U.S. Geol. Surv.*, Part VII, p. 192.

² *Amer. Jour. Sci.*, third series, Vol. XXXIII (April, 1887), p. 298.

general shape of the tracks seems to be slightly different. After examining one of the Somervell County tracks, now in the museum of Southern Methodist University at Dallas, it is noticeable that the heel prints shown in Figures 3 and 4 are proportionately longer, narrower, and usually much better developed than in the Glen Rose tracks. The shape of the heel is shown quite clearly in Figure 4. This difference may be due to the fact that the animal, when walking, did not press down heavily on the heel, but carried the weight thrown forward on the toes. The Glen Rose tracks were quite certainly made by an animal in motion, while those in Hamilton County, with the better development of the heel, may have been made in more of a resting position. It would be interesting to make a comparison of a number of the Hamilton County tracks, to see whether this difference is characteristic of all the tracks found there.

Dinosaur tracks, exclusive of those found in the Texas Cretaceous, have usually been preserved in sandstone which clearly indicates littoral deposition. The tracks were evidently made by animals walking along a wet, sandy beach or in very shallow water. Shuler adequately discussed this problem in the paper referred to above, and the writer concurs in the conclusions there set forth. The tracks seem to have been made in a soft or plastic ooze which was probably covered by several feet of water. This "lime mud" was probably deposited in broad, shallow, quiet seas, relatively free from currents. There is no noticeable amount of sand in the immediately associated strata. Blue-clay shales carrying selenite crystals occur for at least fifteen feet above and three or four feet below the limestone, and in the overlying shales are thin lenses of coquina bearing a typical Glen Rose fauna.

Mr. C. B. James, of Hamilton, who called the writer's attention to the locality, sent a brief description of the Hamilton County tracks, accompanied by photographs, to the Smithsonian Institution, and in a reply C. W. Gilmore wrote:

These are in all probability the footprints of one of the large three-toed dinosaurs. Similar footprints have been reported to the authorities of the Institution from near Glen Rose, Texas. The fossil remains of an animal known as *Trachodon*, have been found in Cretaceous rocks of Texas, which are of sufficient size to have made such tracks as those depicted.